

MODERNIZATION OF THE MAIN TRANSPORTATION HUBS AND THEIR INTERCONNECTION WITH THE HIGHWAY SYSTEM IN BAKU CITY

Abstract. The article considers and analyzes public and transport, transport and interchange, transport and logistics hubs of Baku, formed in different historical periods of urban development.

Modernization of transport hubs is actively carried out in accordance with the requirements of the economy of Azerbaijan, which is integrated into the world economy, and also according to the conditions of modern requirements for this type of architecture. The article provides an overview of the shaping of architectural volumes and capital facilities in the space of transport complexes, the problems of their architectural environment and the possibility of resolution, saturating it with design solutions in the form of street furniture, lighting and non-capital objects, historical and economic background of their interconnections with the city street-road and highways environment.

It presented also the process of architectural and town-planning transformations in the field of transport architecture, its influence and interaction in shaping the town-planning modernization of the city, in the capital of Azerbaijan, Baku, over the past ten years, from 2009 to 2019.

Key words: transport and public hub, railway station, airport, bus station, road, interchange.

Introduction. With the restoration of Independence of Azerbaijan from 1991 to the present, the implementation of transport projects in recent years has fundamentally changed the image of the Azerbaijani capital. The economically advantageous geographical location of the capital of Azerbaijan at intersection of the transport corridors between East and West, North and

South is a comfortable opportunity for the development of transit traffic of passenger and cargo flows. In the format of the national program on transport infrastructure to restore the role of the state as a key logistics hub in the center of Eurasia, in the period from 2009 to 2019, new significant projects in the field of transport environment architecture were carried out in Baku, taking into account its modernization and long-term development. The aforementioned design innovations will form the basis of the new general plan of Baku, which, as a general planning document, should integrate the town-planning activities of architects, investors, developers, government agencies of the city to achieve its integrated, balanced and sustainable development [1]. The public and transport hubs formed or upgraded over the past 10 years in the territory of Baku are located at the intersection of the most important intercity transport arteries and on the departing highways of the city in different directions for entry and exit from the city territory and beyond country. HeydarAliyev International Airport, the station complex of the Azerbaijan State Railway, Baku International Bus Terminal, Baku International Sea Trade Port are transport and public hubs of international importance. Each of these objects has its own age, history of creation and development in space and time, characteristic architectural and planning features, is both a transport hub of international and domestic importance and plays an important role not only in the organization of the transport system and the economic life of Baku, but also the dominant, which forms the town planning policy of the city. After all, what is a public and transport hub, or a hub in the capital of any state or individual metropolis? It is an organism that is composed of the interaction of two or more types of transport systems, their maintenance, maintenance of human and cargo traffic, solutions of linear architecture, which is embodied in its street-road connections with the city, in and out of the city, as well as environmental humane solutions reconciling this organism with human scale and human needs.

The interpretation of the main material. The oldest public transport hub of Baku is the station complex of the Azerbaijan State Railway, located in one of the central and busiest areas of the city, at the junction of transport arteries and with two main exits to the historical part of the city building of the late XIX - early XX centuries, including Azadligsquare - the main city square and the frontroad of Neftchilar avenue; on the other hand, there is a linear site of Ragimov street and Khatai avenue, which overlooks the main thoroughfare

of HeydarAliyev avenue, connecting the city with Airport highway and Baku satellites. This multimodal transport hub is strategic and multifunctional, as it includes several types of operated transport within, externally and internationally importance: railway, metro and urban public (bus and taxi). Each of these types of transport has its own architectural structure and a number of non-capital objects that formed the volume-spatial and planning composition of this transport hub not in the initial general plan of the territory under consideration, but established in stages along with the historical development of the city itself. The main volumes of the architectural and transport environment of this object are the three railway station buildings and the metro station. The first building of the railway station in Baku, was built in 1882 in the Moorish style, according to the project of the Petersburg architect Kh.Vasilyev and named “Tiflis station” in connection with the opening of the railway linking Baku with Tiflis and commissioned in 1883[2]. In the town-planning aspect, the Baku railway station complex played a big role in the development of new city blocks and the unification of urban areas of different types in the late XIX - early XX centuries. The functional environment of the station contributed to the emergence of new transport corridors with outgoing highways, which remain promising for the economic life of Baku to this day and the main “skeleton” in shaping its architectural and transport environment. The construction of the Sabunchu railway station building in 1926 was timed to electrify the railway in the direction of Baku-Sabunchu [2] in 1967, near the building of Sabunchu Station, located a volume of the metro station “28 April” (now “28 May”) of the Azerbaijan State Metro, designed by architects Y. Khachiyev and Sh. Kuliyeu.

The newest and third building of the Baku station was built in 1977 by the project of architects S. Zeynalova and Y. Kozlov and adjoined the building of Tiflis station. The opposite side of Pushkin Street and the station square is built up with public, educational and residential buildings and structures of different years, from 1932 to 2010. Conducting large-scale work on the modernization of the public and transport hub in the 1980s – 90s of the XX century included the construction of two buildings of metro interchange stations with four exits, as well as an extensive network of underground passages [2]. All the above-mentioned architectural volumes, created from the end of the XIX to the beginning of the XXI centuries, formed a functional planning area in the form of a station square with mixed pedestrian and transport traffic. Despite the rich architectural environment

(capital and non-capital), the area is small and is only about 0.2 km². According to its planning decision and classification of the station squares, it refers to 1 (first) type, characterized as a transit one, as its narrow elongated shape and location between important urban highways, on the one hand, the radial artery of Azadlyg Avenue and Fizuli Street, on the other hand - Pushkin Street and Aliyeva and 28 May streets, with the possibility of passing through it, creates a convenient connection between traffic and pedestrian flows [3].

The architectural and compositional analysis indicates the “unaccounted” of the previous stylistic and form-building methods in the design of each subsequent volume structure of this area during all historical periods of construction. Different style solutions of the architecture of the station complex buildings, the contrast of forms and the violation of the scale between their volumes, demonstrate the absence of a dominant, as a result of which, each building is forced to play the role of a “rival” element of this complex spatial composition. The merit of the last modernization in 2015, among other things, was that the organization of the environment of this public center involved a common monochrome color scheme, which visually created the illusion of generic volumes, and its lightness expanded the saturation of the station area [3].

At the present stage, the Baku railway station complex is not only an architectural-planning structure divided into functional zones — transport and public, which include capital and linear structures, but also an example of its effective interaction with all the tasks of these zones and specific features of the transport environment typology, that demonstrates an example of the exploitation of the territory of the station square. Metro and public transport stops being an auxiliary link in solving social and urban tasks, at the same time they are next in the hierarchy of the architectural and transport environment of this site after the station buildings. The front-volume row of the “front” part of the railway station structures and the street-road space, with allotted pavement and road graphics of the transport lines, formed the intuitive navigation and direction of the pedestrian and traffic flows of the area. Most of the station territory is actively exploited by public transport, starting from the era of the horse-drawn tram. It is the starting point of more than a dozen bus routes to different parts of the city, which naturally falls within the tasks of the main urban public transport hub [3].

The public area of the station square, in addition to pedestrian communications, is also equipped with stationary catering facilities in the

station building of 1926, non-capital street food objects from light assembly structures in the form of small pavilions and kiosks, as well as mobile objects, in the form of wagons and carriages. During the city festive events, fairs are held with the establishment of trade pavilions, which creates an additional effect of the temporary environment of the area. The “28 May” mall, which is the object of the mass attraction, locates on the side of Azadlig Avenue and integrated into the station space and thus increases the communication activity of the human and traffic flows of this zone. The facades of capital objects are full of unregulated solutions of graphic design, demonstrated in the form of shop-windows, signs, billboards and other things. The public space of the station square also has four (4) underground passages, which, in addition to the basic meaning, also carry shopping and entertainment loads. On their territory there are small retail outlets, gambling halls and service of various specifics. The public and transport hub of the Baku railway station complex is a complex architectural, urban planning and environmental formation that has been established for 140 years in close connection with the location of the railway station, transport and transit hubs, transport lines, the pedestrian zone, public transportation stops, etc. On its example, one can talk about the effective selection of a site for a territory predicted for the future as early as the 19th century, the spatial unification of various types of volumes and forms of services, as well as the intensification of its use [3].

Heydar Aliyev International Airport has a long history and his first architectural embodiment took place in 1933, when the Bina airport was commissioned, according to the name of the village, located 20 km east of Baku. Here, in 1964, a new building was built according to the project of architect G. Mejidov, which was operated until 2011, carrying out regional flights in recent years. In 1999, the building of the International Airport Terminal Complex was opened, designed by architect V.V. Denisov [4] (now - Terminal 2). In 2011, the building of 1964 was demolished and on its place was built a the newest modern airport, meeting all requirements of international standards, (which became Terminal 1), whose four-story engineering concept was developed in 2010 by Arup Group (UK) in the form of a triangle with a translucent roof and the tollgate having a form of the hyperbolic paraboloid with 72 meter span and a height varying from 16 to 24 meters. Baku is a seismic zone, and the design used a frame resistant system to allow for seismic forces [5]. The AUTOBAN company (Turkey)

designed airport interior with wooden cocoons [6]. In 2014, the airport was commissioned and today it is one of the most beautiful airports in the world. In addition to the two passenger terminals, the following auxiliary facilities were commissioned in different years on the territory allocated for its use: 1999 - aircraft refueling complex; 2005 - Baku Cargo Terminal; 2013 - the hangar complex "Silkway Technics", the International Logistics Center, the new building of the Main Air Traffic Control Center of the Air Navigation Directorate "AZANS" with a 65-meter tower. Sheraton hotel (5*), clinic, mosque and several technical facilities were also built on the territory near the airport buildings. In addition to the operational and aesthetic merits, such as functionality and architectural structure, the HeydarAliyev International Airport is a public and transport hub, because in addition to air (main) transport, it receives and accommodates urban public transport around the clock - taxis and buses plying from the International Railway Station, which indicates a high level of interaction between the two transport hubs of Baku. Stops have been made for buses on the airport's territory, and two parking areas for 20,000 m² of each, accommodating more than 1,600 cars, has been built in front of both terminals to accommodate cars. In the future development, for efficient operation, as well as the approachability of the HeydarAliyevInternational Airport, there is also a plan for the extension of the railway line from the Sabunchu transport hub.

Several major highways connect Baku with the territory of this active public and transport unit, reinforcing its importance and creating comfortable conditions for the population to achieve it. The most significant multi-lane highway, the Airport Highway, goes from West to East, from a large "pendulum" road interchange near the "Koroglu" metro station, from the city to its satellites and through the clover interchange, connecting it with the Mardakan Highway and turns into the territory of its location [7]. The environmental solution of the airport front territory, consisting of a complex pattern of road connections, allowing transport to enter and leave it, to reach numerous objects that were mentioned above; design of small architectural forms, such as the gate in front of the entrance, the building of the lighthouse in the same part; gardening; solution of effective architectural lighting; info graphics and graphic design elements; non-capital objects in the form of terminals to pay for the use of parking; etc., - all this underlines the importance of this hub, which the HeydarAliyevInternational Airport is. In aggregate of all

diversified objects subordinated to the dominant one, this large transport and public hub formed a town-planning cluster at the Baku megalopolis.

The Baku International Bus Terminal complex, designed by architects K. Musakhanov and D. Akhundov (ARCON company) and opened for operation in 2009, is the “youngest” architectural and transport education among the other hubs, but no less important, because the large area of the occupied territory (about 3.7 hectares) and the original architectural design of the four-story (4) building, put it on a par with other significant buildings in the history of modern architecture of Baku [2]. The bus station is located between the territory of the existing motodrome and the Baku-Sumgayit highway, which, after crossing the Khojasan ring road, is divided into the Baku-Guba highway of international importance and further to the border with the Russian Federation and the Baku-Shemakha-Yevlakh highway to the border with Georgia. Since the average height difference between the main access road and the section was 20.50 m, it was this condition that determined the basic compositional idea of the complex of the bus station building and was functionally solved at several levels. The vertical zoning of the bus station space is provided and it allows to divide the passenger flows, thereby ensuring convenience of the facility operation. Different levels involve the arrival of passengers from the city by public transport to one floor with ticket offices, then using stairs, elevators or escalators to descend to the lower floor where the landing terminals locates. The movement of arriving passengers occurs in reverse order. After unloading from buses, the passengers can climb to the upper level and leave the territory of the bus station by public transport or taxi. In addition to these levels, the building provides for mezzanine floors include administrative offices of the complex, duty personnel and technical staff, luggage rooms, cafés, lavatories, communications companies, currency exchange offices, and waiting rooms equipped with internal television and radio broadcasting systems, as well as the same speakerphone systems and alerts. On the two-storey building of the bus station there are shopping center with a total area of 64,000 m² (sales area of 25,000 m²), with industrial goods and catering facilities: restaurants and “fast food” cafes and kids play center. In the northern part of the complex there is the hotel building with 93 rooms, which is part of the bus station, so the project provides easy access from all rooms of the hotel to the traffic and trade zone. In addition, the complex is provided with the possibility of 1100 cars parking, both in the underground

floor and in the area adjacent to the main building. The bus station sends and receives daily more than 20,000 passengers and about 950 buses [8]. Besides the territory of this bus station's building, a space of which receives passenger and traffic flows of republican and international importance around the clock, it also adjoins the opened territory with metro and square of the bus station of urban importance are located. The metro station and the bus station's area are connected by a long underground passage with travolators and escalators, which makes the passage of passengers from one transport object to another one safe and comfortable. The area, which is reserved for the bus station, is located next to the pavilion of metro station and also meets all modern requirements for transport structures of this type. It is conveniently planned for approaching and departing buses, organized by stopping pockets, dividing lines, stops for passengers and info graphics. Unification of objects and functions of the bus station building, metro and bus station in the open air creates a new transport and public hub of Baku in its western direction.

Its location at the departure line of the Sumgait highway precedes the Baladjary railway station complex at the exit of the city and in front of a large road interchange on the "20 January" circle at the entrance to it. Also here is a movement from Sumgait highway to Baku-Shemakha-Yevlakh highway, to Baku ring road-3, Salyan highway and Baku-Alyat-Gazakh-Georgia direction. The main entrance of the intercity and international transport to the territory of the hub is provided by the existing two-tier transport interchange of the Balajar circle, both from Sumgayit and from Baku sites. Urban transport, following from the "20 January" interchange also gets to the lower level through the Balajar Circle.

The Baku International Sea Trade Port, as well as the railway station complex of the Azerbaijan Railway, has a long history. The port of Baku is the oldest port in the Caspian Sea and exists for many historical periods of the Azerbaijan state development. For centuries, it served as a link between East and West, along the ancient Silk Road, as well as the North-South transport corridor connecting Northern Europe and Russia with the Middle East and South Asia. Later foreign traders from Russia, Europe, India and other countries used this route. Construction of the modern port of Baku began in the middle of the XIX c under the Russian Empire, and it was officially opened as a self-governing port on July 21, 1902. Also, the Baku port was one of the leading ports in the world and the largest in the Russian Empire,

equally in freight and passenger traffic. In the Soviet period, the building of the Marine Station was built according to the design of architects V. Shulgin, M. Tovmasyan, I. Orlova-Stroganova in 1970 [9, p.258]. In the following years ferry terminal with a special place for passenger service, new passenger terminal were commissioned at the port complex.

After gaining independence, the Azerbaijan established the close economic relations with neighboring countries. In 2007, it was made a decision to relocate the port of Baku, which at that time was located in the crowded city center, to the new port of Alat, a settlement locates 70 km from Baku, at the intersection of lines TRACECA and the “North-South” transport corridor, as well as being a part of the transport hub, connecting the West (Turkey and the EU), the South (Iran and India) and the North (Russia) [10]. It was designed as a port in the Caspian Sea, a terminal for road and rail transport, and also to a free trade zone governed by its own special legal regime. On land lines, the seaport in Alat is located near the major international highways Alat-Astara-Iran and Baku-Alat-Gazakh-Georgia. Opening ceremony of the new port of Baku in Alat took place in 2018.

A land area of 400 hectares was allocated for this complex construction. The first phase of the new port under construction covers an area of 117 hectares. According to the general plan, the first phase of the new port complex currently under construction will have 12 docks. Within the first phase there are 2 docks for Ro-Ro ships, a universal dry cargo and container terminal consisting of 7 docks, 2 ferry docks, and 1 dock for service ships flotilla. There will also be built a repair base for service vessels of the flotilla, an operational port building, cargo sections and warehouse, border and customs points, in general, 72 buildings and structures for various purposes, designed an international passenger terminal, purchased, equipped and installed cranes. The length of the dock for service vessels of the flotilla in the complex is 155 meters, and 11 small vessels can moor here simultaneously. In 2014, one of the port facilities in the first stage was put into operation - the ferry terminal, consisting of two docks. In addition, within the framework of the project, for the first time in the Caspian Sea basin, biological water treatment plants based on the latest technologies were built for cleaning pumped out water from oil-filled and domestic water. To date, a fleet of receiving, sending and sorting cars has been created consisting of 11 railway lines. All of the above facilities belong to the category of transport architecture and form the environment of the transport and logistics complex.

Public and transport and logistics hubs fall into both internal and international categories, but over the past two years, in Baku, it has been opened the transport hubs of intercity category too. A large transport and transit hub, combining the bus station and the Koroglu metro station, is located at a major road interchange, which includes nine bridges and a highway located at the intersection of Heydar Aliyev and Z. Buniyatrov Avenues. The interchange is also a pendulum, since it serves as a daily migration of passengers from nearby Baku satellites to the city and back. Heydar Aliyev Avenue passing to Boyukshor highway, one of the main directions to the airport, passing through the area of the Koroglu metro station. At the same time, the transport coming from the airport received a direct access to the Bakikhanov and “8th kilometer” settlements, passing the old transport routes that could no longer cope with the cars flow [7]. The location of the hub on such dynamic transportation interchange is a very priority urban planning decision. After the opening of the railway line between Baku railway station and Sabunchi station, which is planned in the near future, a high-speed train will start run, increasing the importance of the transport hub near the Koroglu metro station even more, as well as the importance of a convenient transfer hub between the three types of transport, passing through the metro stops “Keshlya”, “Koroglu” and “Bakikhanov”.

Conclusion. In the format of the national program for the transport infrastructure restoration for the renewing the state role as a key of the logistics hub in the center of Eurasia, it were carried out new significant projects in the field of transport environment architecture in Baku, from 2009 to 2019, taking into account its modernization and future development. The aforementioned design innovations will form the basis of the new general plan of Baku, which, as a general planning document, should integrate the town-planning activities of architects, investors, developers, government bodies of the city to achieve its integrated, balanced and sustainable development.

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Fəridə Qasımova (Azərbaycan)

Əsas nəqliyyat qovşaqlarının müasirləşdirilməsi və onların Bakı şəhərində sürətli yollar şəbəkəsi ilə qarşılıqlı əlaqəsi

Məqalədə şəhərin inkişafının müxtəlif tarixi dövrlərində yaradılmış ictimai-nəqliyyat, nəqliyyat-yerdəyişmə və nəqliyyat-loqistika qovşaqları nəzərdən keçirilir və təhlil edilir.

Nəqliyyat qovşaqlarının müasirləşdirilməsi dünya iqtisadiyyatına inteqrasiya etmiş, həmçinin bu tipli memarlığa müasir tələblərin şərtlərinə uyğun olaraq fəal surətdə icra edilir. Məqalədə nəqliyyat kompleksləri məkanında memarlıq həcmələrinin və əsaslı obyektlərin forma təşkili, onların memarlıq mühitinin problemləri və həllinin imkanları, onun dizayner həllinin küçə məbəli şəklində təchiz edilməsi, onların şəhərin küçə-yol mühitinə zəmin yaradılması barədə icmal təqdim edilir.

Eləcə də memarlıq və şəhərsalma islahatlarının nəqliyyat memarlığı sahəsində gedişi, onun təsiri və şəhərin müasirləşdirilməsinin formalaşmasında qarşılıqlı təsiri Azərbaycanın paytaxtı Bakı şəhərində son on ildə, 2009-cu ildən 2019-cu ilə qədər təsvir edilir.

Açar sözlər: nəqliyyat və ictimai qovşaq, dəmiryolu stansiyası, avtobus stansiyası, yol, əvəz etmək.

Фарида Гасимова (Азербайджан)

Модернизация основных транспортных узлов и их взаимодействие с сетью скоростных трасс в г. Баку

В статье рассматриваются и анализируются общественно-транспортные, транспортно-пересадочные и транспортно-логистические узлы Баку, образованные в разные исторические периоды городского развития.

Модернизация транспортных узлов активно производится согласно требованиям экономики Азербайджана, которая интегрирована в мировую экономику, а также согласно условиям современных требований к архитектуре данного типа. В статье представлен обзор о формообразовании архитектурных объемов и капитальных объектов в пространстве транспортных комплексов, проблемы их архитектурной среды и возможности разрешения, насыщение ее дизайнерскими решениями в виде уличной мебели, освещения и некапитальных объектов, исторические и экономические предпосылки их взаимосвязей с улично-дорожной средой города.

Также представлено течение архитектурных и градостроительных преобразований в области транспортной архитектуры, ее влияние и взаимодействие в формировании градостроительной модернизации города, в столице Азербайджана, городе Баку, за последние десять лет, с 2009 по 2019 годы.

Ключевые слова: транспортный и общественный узел, железнодорожная станция, автобусная станция, дорога, изменение.